## IN THE CLAIMS

Claims 1-17 are cancelled herein. Claims 18, 26, and 33 have been amended. All pending claims are reproduced below.

- 1 1. (Cancelled)
- 1 2. (Cancelled)
- 1 3. (Cancelled)
- 1 4. (Cancelled)
- 1 5. (Cancelled)
- 1 6. (Cancelled)
- 1 7. (Cancelled)
- 1 8. (Cancelled)
- 1 9. (Cancelled)
- 1 10. (Cancelled)
- 1 11. (Cancelled)
- 1 12. (Cancelled)
- 1 13. (Cancelled)

1	14.	(Cancelled)	
1	15.	(Cancelled)	
1	16.	(Cancelled)	
1	17.	(Cancelled)	
1	18.	(Currently Amended) A method for compiling a functional description	on expressed
2	in an interpre	etive, algorithmic language into target code for selected hardware, the r	nethod
3	comprising the	the steps of:	
4		receiving parsing the functional description expressed in the interpretation	
5	algor	rithmic language with at least one undeclared variable into an abstract s	syntax tree,
6		inferring a type and dimension for the undeclared variable by analyz	zing the usage
7	of the	ne undeclared variable in the abstract syntax tree;	
8		assigning a the inferred type and a dimension to the at least one und	leclared
9	varia	able by analyzing the functional description to form an abstract syntax	<del>tree</del> ;
10		transforming compound statements in the abstract syntax tree into a	series of
11	sing	gle statements; and	
12		translating the abstract syntax tree into a register transfer level form	nat.
1	19.	(Previously Presented) The method for compiling a function	al description
2	of claim 18	8. further comprising the steps of:	

3	receiving a user directive file including at least one user defined directive selected			
1	from the group consisting of constraint directives, assertions, and compiler hints; and			
5	annotating the functional description according to the user directive file.			
l	20. (Previously Presented) The method for compiling a functional description			
2	of claim 18, further comprising the steps of:			
3	analyzing a value range of the at least one undeclared variable; and			
4	assigning a required precision for the at least one undeclared variable.			
1	21. (Previously Presented) The method for compiling a functional description			
2	of claim 20, further comprising the step of:			
3	parsing a real undeclared variable into an integer part and a fractional part,			
4	wherein said real undeclared variable is one of said at least one undeclared variable.			
1	22. (Previously Presented) The method for compiling a functional description			
2	of claim 18, further comprising the steps of:			
3	analyzing array access patterns across loop iterations; and			
4	replacing a statement in a loop including a memory access with multiple			
5	statements including the memory access to reduce the number of individual memory			
6	accesses.			
1	23. (Previously Presented) The method for compiling a functional description			
2	of claim 18, further comprising the steps of:			

3	analyzing compound loop structures to identify piperine opportunities, and
4	applying the pipeline algorithm to pipeline opportunities to generate nodes
5	corresponding to the loop body, predicate nodes corresponding to loop conditional
6	statements, and a schedule for scheduling pipeline operations.
1	24. (Previously Presented) The method for compiling a functional description of
2	claim 18, wherein the step of transforming compound statements in the abstract syntax tree into a
3	series of single statements comprises the step of:
4	expanding a matrix operation into at least one loop.
1	25. (Previously Presented) The method for compiling a functional description of
2	claim 18, wherein the step of transforming compound statements in the abstract syntax tree into a
3	series of single statements comprises the step of:
4	deconstructing a compound statement into at least one simple statement.
1	26. (Currently Amended) A system for compiling a functional description expressed
2	in an interpretive, algorithmic language into target code for selected hardware comprising:
3	a parser for receiving parsing the functional description expressed in the
4	interpretive, algorithmic language with at least one undeclared variable into an abstract
5	syntax tree;
6	a type-shape analyzer, coupled to the parser, for assigning inferring a type and a
7	dimension to the at least one undeclared variable by analyzing use of the undeclared
8	variable in the abstract syntax tree the functional description to form an abstract syntax
9	<del>tree</del> ;

10	a statement deconstructor, coupled to the type-shape analyzer, for transforming		
11	compound statement in the abstract syntax tree into at least one simple statement; and		
12	a translator, coupled to the statement deconstructor, for translating the abstract		
13	syntax tree into a register transfer level format.		
1	27. (Previously Presented) The system for compiling a functional description		
2	of claim 26, further comprising:		
3	a user directive file, coupled to the parser, for annotating the functional		
4	description with at least one user defined directive selected from the group consisting of		
5	constraint directives, assertions, and compiler hints.		
1	28. (Previously Presented) The system for compiling a functional description		
2	of claim 26, further comprising:		
3	a precision analyzer, coupled to the type-shape analyzer, for determining the		
4	precision of the at least one undeclared variable.		
1	29. (Previously Presented) The system for compiling a functional description		
2	of claim 28, further comprising:		
3	a real number parser, coupled to the precision analyzer, for parsing a real number		
4	into an integer part and a fractional part.		
1	30. (Previously Presented) The system for compiling a functional description		
2	of claim 26, further comprising:		

3	a memory access optimizer, coupled to the statement deconstructor, for analyzing
4	array access patterns across loop iterations and replacing a statement in a loop including a
5	memory access with multiple statements including the memory access to reduce the
6	number of individual memory accesses.
1	31. (Previously Presented) The system for compiling a functional description of claim 26, further comprising:
2	of claim 20, further comprising.
3	a pipeline optimizer, coupled to the statement deconstructor, for analyzing
4	compound loop structures to identify pipeline opportunities and applying the pipeline
5	algorithm to pipeline opportunities to generate nodes corresponding to the loop body,
6	predicate nodes corresponding to loop conditional statements, and a schedule for
7	scheduling pipeline operations.
1	32. (Previously Presented) The system for compiling a functional description
2	of claim 26, wherein the statement deconstructor for transforming a compound statement in the
3	abstract syntax tree into at least one simple statement comprises:
4	a scalarizer, coupled to the type-shape analyzer, for expanding a matrix operation
5	into at least one loop.
1	33. (Currently Amended) One or more computer readable storage devices having
2	computer readable code embodied on said computer readable storage device, said computer
3	readable code for programming one or more computers to perform a method for compiling a
4	functional description expressed in an interpretive, algorithmic language into target code for

5

selected hardware, the method comprising the steps of:

6	receiving parsing the functional description expressed in the interpretive,
7	algorithmic language with at least one undeclared variable into an abstract syntax tree;
8	inferring a type and dimension for the undeclared variable by analyzing the usage
9	of the undeclared variable in the abstract syntax tree;
10	assigning a the inferred type and a dimension to the at least one undeclared
11	variable by analyzing the functional description to form an abstract syntax tree;
12	transforming compound statements in the abstract syntax tree into a series of
13	single statements; and
14	translating the abstract syntax tree into a register transfer level format.
1	34. (Previously Presented) One or more computer readable storage devices
2	having computer readable code embodied on said computer readable storage device, said
3	computer readable code for programming one or more computers to perform a method for
4	compiling a functional description of claim 33, further comprising the step of:
5	receiving a user directive file including at least one user defined directive selected
6	from the group consisting of constraint directives, assertions, and compiler hints; and
7	annotating the functional description according to the user directive file.
1	35. (Previously Presented) One or more computer readable storage devices
2	having computer readable code embodied on said computer readable storage device, said
3	computer readable code for programming one or more computers to perform a method for
4	compiling a functional description of claim 33, further comprising the step of:

5	analyzing a value range of the at least one undeclared variable; and
6	assigning a required precision for the at least one undeclared variable.
1	36. (Previously Presented) One or more computer readable storage devices
2	having computer readable code embodied on said computer readable storage device, said
3、	computer readable code for programming one or more computers to perform a method for
4	compiling a functional description of claim 33, further comprising the step of:
5	analyzing array access patterns across loop iterations; and
6	replacing a statement in a loop with a memory access with multiple statements
7	with the memory access to reduce the number of individual memory accesses.
1	37. (Previously Presented) One or more computer readable storage devices
2	having computer readable code embodied on said computer readable storage device, said
3	computer readable code for programming one or more computers to perform a method for
4	compiling a functional description of claim 33, further comprising the step of:
5	analyzing compound loop structures to identify pipeline opportunities; and
6	applying the pipeline algorithm to pipeline opportunities to generate nodes
7	corresponding to the loop body, predicate nodes corresponding to loop conditional
8	statements, and a schedule for scheduling pipeline operations.